

ABSTRACT

An apparatus and method for estimating reflected radiance under complex distant illumination are described. In one embodiment, an importance sampling estimator is used with a novel piecewise constant importance function that effectively concentrates ray samples where energy is likely to be found. To properly account for the effects of a visibility term in the shading calculation, in one embodiment, a shadow cache is provided which caches information indicating ray directions that are occluded or unoccluded from a point in space. Accordingly, by concentrating hemispheric samples where the light source is likely to be strongest, a reflected radiance integral is efficiently computed and estimated in a real-world lighting situation.